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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample is included. (AG)

ED 066459

TECHNICAL REPORT

ON

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

TYPESETTER-PERFORATOR OPERATOR (print. & pub.) 1-37.41

TAPE-PERFORATING-MACHINE OPERATOR (print. & pub.)
B-577 S-247

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U. S. Employment Service
in Cooperation with
Alabama, California, Connecticut, Florida, Illinois, Iowa, Michigan, Minnesota, Nebraska, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee and Wisconsin State Employment Services

Key State Agency - North Carolina

March 1964

GATB # 2483

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

TELETYPE OPERATOR (print. & pub.) 4-44.120
TAPE-PERFORATING-MACHINE OPERATOR (print. & pub.)

B-577

Summary

The General Aptitude Test Battery was administered to a final sample of 193 persons employed as Teletype Operator 4-44.120 by various publishing companies in fifteen States. The criterion consisted of supervisory ratings. On the basis of mean scores, standard deviations, correlations with the criterion, job analysis data and their combined selective efficiency, Aptitudes G-Intelligence, Q-Clerical Aptitude and K-Motor Coordination were selected for inclusion in the final test norms.

GATB Norms for Teletype Operator 4-44.120, B-577.
Tape-Perforating-Machine Operator

B-1001			B-1002		
Aptitude	Tests	Minimum Acceptable Aptitude Score	Aptitude	Tests	Minimum Acceptable Aptitude Score
G	CB-1-H CB-1-I CB-1-J	110	G	Part 3 Part 4 Part 6	105
Q	CB-1-B	100	Q	Part 1	100
T	CB-1-G CB-1-K	85	K	Part 8	90

Effectiveness of Norms

The data in Table IV indicate that only 67 percent of the non-test-selected workers used for this study were good workers; if the workers had been test-selected with the above norms, 76 percent would have been good workers. 33 percent of the non-test-selected workers used for this study were poor workers; if the workers had been test-selected with the above norms, only 24 percent would have been poor workers.

TECHNICAL REPORT

I. Purpose

This study was conducted to determine the best combination of aptitudes and minimum scores to be used as norms on the General Aptitude Test Battery for the occupation of Teletype Operator 4-44.120.

II. Sample

The test development research reported herein was conducted at the suggestion of, and in cooperation with, the Educational Council of the Graphic Arts Industry, Inc. and American Newspaper Publishers Association.

The General Aptitude Test Battery, B-1002, was administered during the period September 1962-November 1963 to a final sample of 183 individuals employed as Teletype Operator 4-44.120. The name and location of each company from which the final sample was obtained, and the number of employees tested at each company are as follows:

Company	Location	No. Tested
Anniston Star	Anniston, Alabama	2
Advertiser-Journal	Montgomery, Alabama	8
Los Angeles Times	Los Angeles, California	8 (Cal. total)
Daily Beam	Redondo Beach, California	
Riverside Press-Enterprise	Riverside, California	
Santa Barbara News-Press	Santa Barbara, California	
News-Times	Danbury, Connecticut	4
Hartford Courant	Hartford, Connecticut	9
Fort Lauderdale News	Fort Lauderdale, Florida	41 (Fla. total)
Orlando Sentinel	Orlando, Florida	
St. Pertersburg Times	St. Petersburg, Florida	
Alton Evening Telegraph	Alton, Illinois	2
Bloomington Daily Pantograph	Bloomington, Illinois	4
Illinois State Journal	Springfield, Illinois	14
Waukegan News-Sun	Waukegan, Illinois	6
Clinton Herald	Clinton, Iowa	3
Sioux City Journal	Sioux City, Iowa	3
Pontiac Press	Pontiac, Michigan	5
Port Huron Times Herald	Port Huron, Michigan	1
St. Paul Dispatch	St. Paul, Minnesota	7
Lincoln Star & Journal	Lincoln, Nebraska	8
Kinston Daily Free Press	Kinston, North Carolina	2
News and Observer	Raleigh, North Carolina	8
Winston Salem Journal & Sentinel	Winston Salem, North Carolina	6
Canton Repository	Canton, Ohio	6
Findlay Republican Courier	Findlay Ohio	2
Sandusky Register	Sandusky, Ohio	3
Zanesville Times Recorder	Zanesville, Ohio	7

Company	Location	No. Tested
Valley Daily News	Tarentum, Pennsylvania	6
Herald Publishing Co.	Rock Hill, South Carolina	1
Johnson City Press-Chronicle	Johnson City, Tennessee	4
Eau Claire Leader Telegram	Eau Claire, Wisconsin	4
Green Bay Press Gazette	Green Bay, Wisconsin	3
Janesville Gazette	Janesville, Wisconsin	3
Manitowoc Herald Times	Manitowoc, Wisconsin	3
	Total	183

The number of males and females in the final sample is approximately the same (because of incomplete data on sex of the final sample, exact figures cannot be reported).

No rigid requirements regarding age and sex were used by the above companies in selecting individuals for employment as Teletype Operators. Preferred for employment are high school graduates having more than average competence in grammar and spelling and having either typing experience or vocational training in teletypesetting.

TABLE I

N = 183	$\bar{X}$	σ	Range	r
Age	33.9	9.7	19-64	-.109
Education	12.4	1.3	9-19	.064
Experience	83.8	55.9	12-288	.135

III. Job Description

Job Title: Teletype Operator 4-44.120
Tape-Perforating-Machine Operator

Job Summary: Operates a modified telegraphic typewriter to produce a perforated tape which controls an automatic linotype machine.

Work Performed: Obtains copy to be typed and scans specific directions as to length of lines and unusual spacing. Sets machine and adjusts indicators, using a socket wrench and thumb screws, to produce desired spacing and type size results. Types from copy on a machine equipped with a modified typewriter keyboard and supplementary symbols. Observes stroke indicator to maintain close alignment of right hand margin. Makes minor spacing adjustments to punched lines and obliterates and retypes erroneously punched material. May feed resulting tape into an automatic reading and transmitting machine. Notifies linotype tender by signal light system when tape is ready for transmission. Operates small tape rolling machine to roll up tape for later use.

NOTE: During the training period, the Teletype Operator 4-44.120 learns the basic principles of the automatic linotype operation, symbols used, spacing requirements and the methods of setting up the machines.

IV. Experimental Battery

All the tests of the GATB, B-1002, were administered to the sample group; Form B was given to 180 individuals and Form A to 3 individuals.

V. Criterion

The criterion data consisted of two sets of independent ratings made by first-line supervisor on USES Form SP-21, "Descriptive Rating Scale." This rating scale is comprised of nine items covering different aspects of job performance, with five alternatives for each item. Weights of one through five indicating the degree of job proficiency attained were assigned to the alternatives. The first ratings were made on approximately the same date as testing. A period of at least two weeks elapsed between the first and second ratings. Of the 183 persons in the final sample, 169 had two ratings; a reliability coefficient of .927 was obtained for the criterion. Therefore, the two sets of ratings were combined (single ratings for 14 persons were doubled to obtain final criterion scores), resulting in a distribution of final criterion scores of 33-89, with a mean of 65.8 and a standard deviation of 12.5.

VI. Qualitative and Quantitative Analyses

A. Qualitative Analysis

On the basis of the job analysis data, the following aptitudes were rated "important" for success in this occupation:

Intelligence (G) - required to understand directions, to set perforating machine and adjust indicators to produce type of copy desired.

Verbal Aptitude (V) - required to recognize words quickly and accurately and understand their meaning.

Form Perception (P) - required to perceive pertinent details such as margins, spacing and size of type in copy.

Clerical Perception (Q) - required to compare perforated tape with copy and make corrections in punched material.

Motor Coordination (K) - required to make rapid movements of hands and fingers in response to visual stimuli.

Finger Dexterity (F) - required to manipulate keys with speed and accuracy.

B. Quantitative Analysis:

TABLE II

Means (M), Standard Deviations (σ), and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB; N = 183

Aptitudes	M	σ	r
G-Intelligence	110.2	14.9	.298**
V-Verbal Aptitude	112.7	14.5	.211*
N-Numerical Aptitude	106.0	15.6	.309**
S-Spatial Aptitude	103.8	17.4	.114
P-Form Perception	107.0	17.9	.132
Q-Clerical Perception	120.4	17.2	.248**
K-Motor Coordination	114.0	15.5	.168*
F-Finger Dexterity	102.1	18.5	.048
M-Manual Dexterity	100.7	20.5	.052

*Significant at the .05 level
**Significant at the .01 level

C. Selection of Test Norms:

TABLE III

Summary of Qualitative and Quantitative Data

Type of Evidence	Aptitudes								
	G	V	N	S	P	Q	K	F	M
Job Analysis Data									
Important	X	X			X	X	X	X	
Irrelevant									
Relatively High Mean		X				X	X		
Relatively Low Sigma	X	X							
Significant Correlation with Criterion	X	X	X			X	X		
Aptitudes to be Considered for Trial Norms	G	V	N			Q	K		

Trial norms consisting of various combinations of Aptitudes G, V, N, Q and K with appropriate cutting scores were evaluated against the criterion by means of the Phi Coefficient technique. In establishing the various trial combinations of aptitudes and cutting

scores, consideration was given to the printing industry's problem as to whether Typists, Compositors or both should be recruited for job openings for Teletype Operators. A comparison of the results showed that norms having selective efficiency for Teletype Operators also have selective efficiency for both Typists (data for USES aptitude test battery B-215) and Compositors (data for USES aptitude test battery B-291). On the basis of these results, B-1002 norms consisting of G-105, Q-100 and K-90 had the best selective efficiency for Teletype Operator 4-44.120. (The B-215 and B-291 norms are not being superseded because the validity coefficients obtained when applying the Teletype Operator norms to the B-215 and B-291 data are not higher than the current validity coefficients for these batteries.)

VII. Validity of Norms

The validity of the norms was determined by computing a Phi Coefficient between the test norms and the criterion and applying the Chi Square test. The criterion was dichotomized by placing 33 percent of the sample in the low criterion group because this percent was considered to be the unsatisfactory or marginal workers.

Table IV shows the relationship between B-1002 test norms consisting of Aptitudes G, Q and K with critical scores of 105, 100 and 90, respectively, and the dichotomized criterion for Teletype Operator 4-44.120. Workers in the high criterion group have been designated as "good workers" and those in the low criterion group as "poor workers."

TABLE IV

Validity of Test Norms for Teletype Operator 4-44.120
(G-105, Q-100, K-90)

N = 183	Non-Qualifying Test Scores	Qualifying Test Scores	Total
Good Workers	36	87	123
Poor Workers	33	27	60
Total	69	114	183

Phi Coefficient = .249
χ^2 = 11.346
P/2 < .0005

The data in the above table indicate a significant relationship between the test norms and the criterion for the sample.

VIII. Conclusions

On the basis of the results of this study, Aptitudes G, Q and K with minimum scores of 105, 100 and 90, respectively, have been established as B-1002 norms for Teletype Operator 4-44.120. The equivalent B-1001 norms consist of G-110, Q-100 and T-85.

IX. Determination of Occupational Aptitude Pattern

The data for this study were used in the establishment of OAP-36, a new occupational aptitude pattern for Section II of the Guide to the Use of the General Aptitude Test Battery, January 1962. The norms for OAP-36 are as follows:

B-1002 Cutting Scores				B-1001 Cutting Scores	
Aptitudes	Adult	Grade 10	Grade 9	Aptitudes	Adult
G	105	101	96	G	110
Q	100	94	91	Q	100
K	90	84	81	T	85